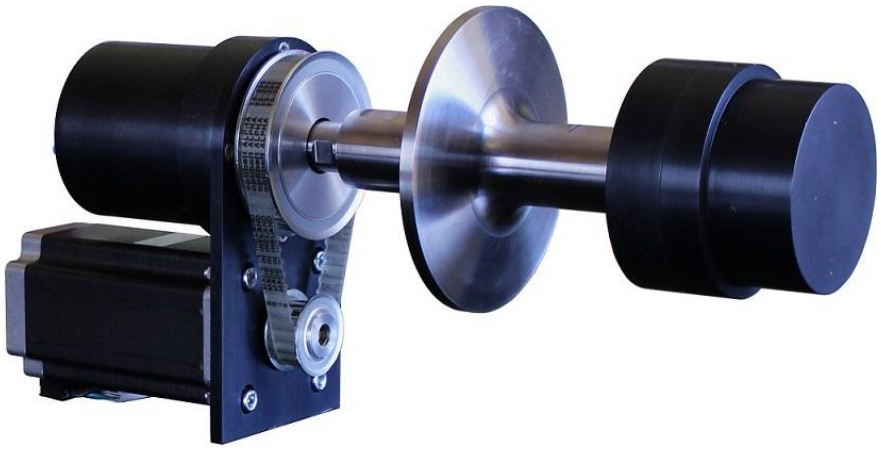
soniKKs
ULTRASONICS TECHNOLOGY

User Guide
soniKKs Stepper Motor Controller
For continuous welding operations



soniKKs GmbH
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Overview

The soniKKs Stepper Motor Controller (SMC) is a complete solution for stepper motor controlling, designed to be used in addition to a welding generator for continuous welding tasks.

Its uncluttered and classic user interface makes it a really easy-to-use device. As for all the soniKKs products, it is equipped with a 2.4" LCD display, combined with a rotary encoder for a simple navigation. An additional testbutton allows turning ON and OFF the motor locally, while an interface connector, located on the back panel, enables to connect the unit to a remote PLC.

The welding speed is configurable within a range from 0.01 m/min up to 30 m/min, with a resolution of 0.01 m/min. Besides, it offers the possibility to change sonotrodes. The software then adapts the motor speed consequently, using the sonotrode diameter provided by the user. This way, it makes it possible to use sonotrodes with diameters from 50 mm to 200 mm.

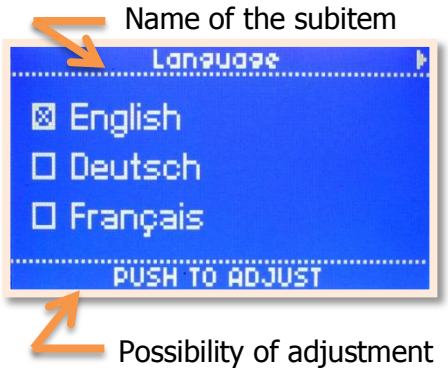
Front and back panels of the SMC

The SMC is available in a "rack" package. It makes it suitable to fit in a single housing together with a K2 welding generator (see picture on the right).

Menu-items and operation

The SMC is operated by a rotary encoder, which can be turned as well as pushed. This makes the operation very easy and uncomplicated.

The menu is structured in several subitems (see navigation chart). You can change items by turning the rotary encoder.



In the top of the display you can see the **name of the subitem.** In the bottom, you can see whether the screen only displays information or if **adjustments can be done** (see also color-code of the navigation chart). In this case, the bottom bar will display "PUSH TO ADJUST" (see picture on the right).

To modify a parameter, you must first enter the editing mode by pushing the rotary encoder as denoted in the bottom bar. At this point, one of the options will become highlighted, as well as the bottom bar. It makes it also very easy to distinguish the editing mode from normal "navigation" mode.

The adjustment of the values or the selection of the options is done by turning the rotary encoder. Pushing the rotary encoder a second time either brings you to the next parameter's adjustment or closes the editing mode if there is only one adjustable parameter in the screen, as it is the case for the language screen for instance.

Status LEDs

READY	ON: the unit is ready to work
ERROR	ON: an error occurred
TEMP.	ON: the unit is overheating

Navigation chart

Your logo / "Hello"

Menu items

Welding speed	Parameters	Run Time
Welding speed Motor speed	Displays the current parameters	Displays the current run's duration

Setup
Access to the settings

Settings

Language	Greetings	Display
English German French	Hello Logo	Contrast Backlight Beeper

Testbutton	Direction Mode	Direction
Off Push Latch	Local Remote	Clockwise Anti-clockwise

Caption

Transition

Display

Adjustment is possible

Motor speed not adjustable directly

Settings (continued)

Sonotrode Diameter

Indicate the size of your sonotrode

Info

Displays some info about the device

Exit

Back to the main menu

Transition

Display

Adjustment is possible

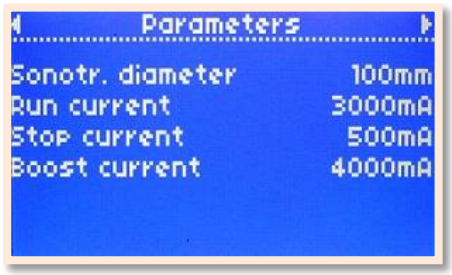
Screens

1. Welding Speed

This screen allows adjusting the welding speed between 1 meter per minute and 30 m/min with a resolution of 0.1 m/min.

The corresponding motor rotational speed is also displayed, but not directly adjustable. It is deduced from the welding speed, considering the sonotrode diameter (see on page 11) and the gear ratio (factory setting). Thus, please make sure that the correct diameter has been set before running the motor, otherwise the actual speed will not match the nominal speed set in this screen.

2. Parameters



In this screen, you can review the main parameters of the motor controller.

- ✓ Sono. diameter: the diameter of the sonotrode.
- ✓ Run current: the current limitation during continuous operation.
- ✓ Stop current: the current limitation while the motor is idle. This will determine the torque that the motor will oppose to keep its position.
- ✓ Boost current: the current limitation during acceleration and deceleration phases.

The sonotrode diameter must be set by the user (see on page 11). The current limitations are all set in factory and depend on the motor's characteristics.

3. Run time

This timer measures the duration of the runs, from the moment the motor starts to the moment it stops. Once the motor stops, the previous run's duration stays displayed until the next run. The timer is then reset to start measuring the new run.

4. Setup screen

This screen is the gateway to the settings screens, whose access is protected by a password.

As you can see, the password is a 5-digit long, numeric password.

When entering the screen, the first digit is already displayed and editable. Turn the encoder until you reach the desired number. Then, press the encoder to confirm and edit the next digit.

Repeat the same operation for all of the 5 numbers.

Please note that a wrong combination will yield an error message.

5. Settings screens

- **LANGUAGE**

  Here you can choose the language in which the display contents are displayed.

  Proceed as normal to activate the adjustment mode and change the settings.

  ATTENTION: For your own safety, do not choose a language you do not understand. The language changes immediately by confirming your choice and the menu appears in the chosen language, which could be foreign to you.

GREETINGS

This screen allows you to choose what will be displayed on startup. You can either select to display the stored logo or a simple "Hello" message.

DISPLAY

Here you can tune display-related parameters such as the contrast and the backlight. You can also activate/de-activate the beeper.

Push the rotary encoder to enter adjustment mode.

Select the desired contrast level by turning the encoder and push it to confirm the change.

Repeat the same operation for the backlight. As you will notice, you can choose between the three options below:

- ✓ On: the backlight is switched on permanently
- ✓ Auto: the backlight switches automatically off after a while if the SMC is not used
- ✓ Dim: the backlight is dimmed to a low level

Push again to set the displayed option and go on to the beeper adjustment. Choose between "On" and "Off".

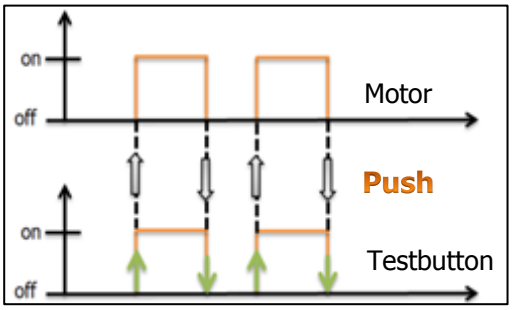
TESTBUTTON

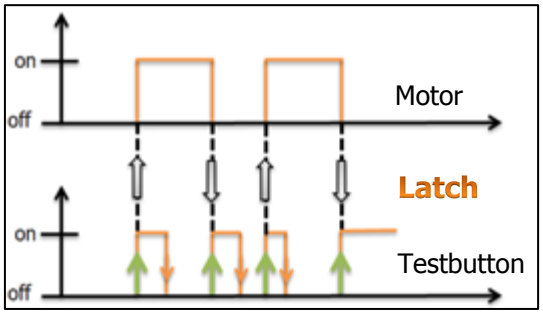
In this screen, you can define the testbutton's behaviour. Three modes are available: "Off", "Push" and "Latch".

Proceed as normal to activate the adjustment mode and change the settings.

- ✓ Off: the testbutton is unused

- ✓ Push: the motor runs as long as the testbutton is pushed
- ✓ Latch: the testbutton being pushed either starts or stops the motor, depending on the state of the motor: if it is running, then it stops (and conversely).





REMOTE

In this screen, you can define the remote's behaviour. Three modes are available: "Off", "Static" and "Latch".

Proceed as normal to activate the adjustment mode and change the settings.

- ✓ Off: the remote is unused
- ✓ Static: the motor runs as long as the remote signal is active
- ✓ Latch: the remote being activated either starts or stops the motor, depending on the state of the motor: if it is running, then it stops (and conversely).

NB: "Static" corresponds to "Push" in the testbutton's section. Refer to the graphs above for more information.

DIRECTION MODE

In this screen, you can choose how you want to control the direction of rotation of the motor. You can either do it locally by navigating to the "Direction" screen (see below) or remotely through the interface (see the "Interface" section on pages 13-14).

Note that the two modes cannot be active at the same

time. Therefore, the access to the "Direction" screen will be restricted in remote mode while the direction input signal will be ignored in local mode.

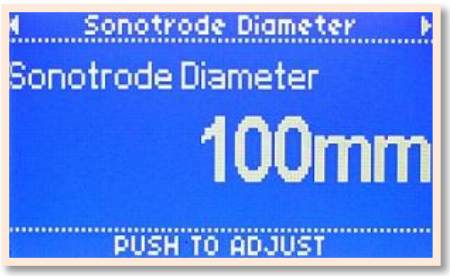
- **DIRECTION**

This screen enables to switch the direction of rotation of the motor.

The direction should be considered when facing the motor so that the pinion gear appears to you.

- **SONOTRODE DIAMETER**

This screen allows setting the diameter of the sonotrode being used. This parameter is of great importance as it is used to determine the rotational speed of the motor, given a certain nominal welding speed.

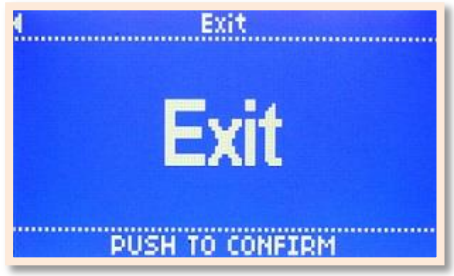


- **INFO**

General information about the unit can be found in this screen (software version, internal temperature…).

- **EXIT**

Pushing the rotary encoder makes you leave the settings and brings you back to the "Switchbox State" screen.



Operating the soniKKs stepper motor controller

The soniKKs stepper motor controller is extremely easy to use, since few parameters need to be configured.

1. Configuring the unit

Before starting running the motor, the following parameters need adjusting:

- The direction of rotation of the motor (pages 11-12 and section below)
- The sonotrode diameter (page 11)
- The desired welding speed

Additionally, you can also configure the remote's mode and/or the testbutton's mode if you want to operate the motor locally.

2. Interface

➢ INTERFACE CONNECTOR

The connection between your controller and the SMC can be made via the DB9 socket located on the back panel. The pin out is the following:

Pin	Name	Direction	Level	Description
1	MOTOR_ON	Input	0-24V	Trigger input (rising edge detection)
2	DIRECTION	Input	0-24V	0V: clockwise 24V: anti-clockwise
3	ERROR	Output	0-24V	Error status
4	-	-	-	-
5	READY	Output	0-24V	Ready status
6	-	-	-	-
7	-	-	-	-
8	GND	Output	-	Ground reference of the SMC
9	GND	Output	-	Ground reference of the SMC

- **MOTOR_ON**

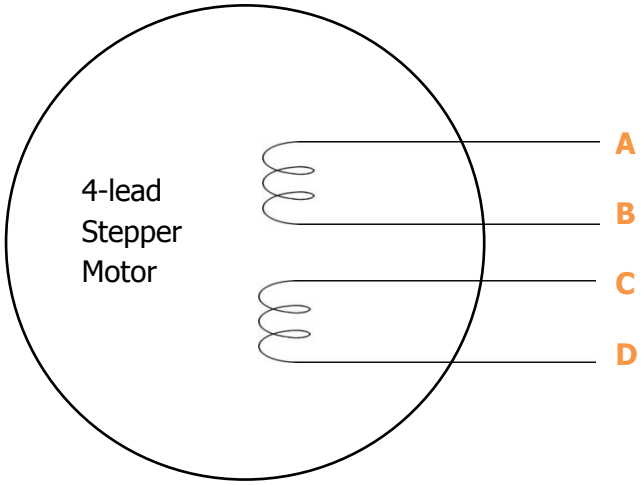
The remote triggering works in a "static" or "latch" fashion, as described in the Remote section (page 11). This means that the motor is started with a pulse and stopped with a second pulse.

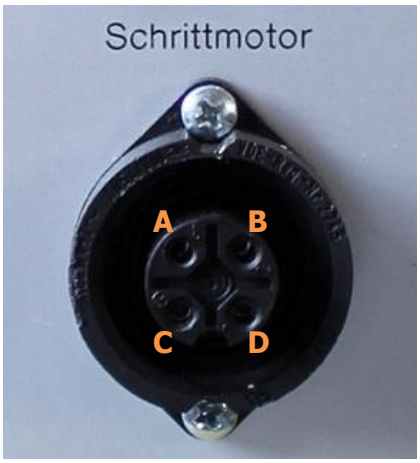
- **DIRECTION**

Once you have set the Direction Mode to "Remote" (see page 11), you will be able to control the direction of rotation of the motor. A low level (0V) will cause the motor to rotate clockwise while a high level (+24V) will make it turn anti-clockwise.

- **MOTOR CONNECTOR**

The stepper motor should be connected to the black connector as shown below:





ATTENTION: Please notice that the direction of rotation, as described in the "Direction" paragraph (page 11), may not be relevant anymore if you invert the polarity of one of the coils. If this is the case, just switch A with B (or C with D).

Error messages

When an error is detected, the motor is stopped and one of the error messages below appears. The device then remains in error state until the user presses the rotary encoder.

Error message	Explanation
	➢ The internal controller does not start. Contact us if this happens.
	➢ The SMC internal temperature has reached the maximum temperature. Wait for the temperature to fall again below 75°C. The motor is stopped as soon as this error occurs.
	➢ A short-circuit has been detected.
	➢ The internal power stage does not provide the unit with enough voltage.
	➢ Any error other than the ones above.

Maintenance and care

There is no need for special maintenance! Please remove any dust and dirt with a damp woven fabric. Do not use any chemicals to clean the device. Keep the cooling slots clear all time.

Warranty

The period and extent of the warranty is part of the commercial terms and conditions. Special agreements are part of the confirmation of the order.

The warranty does not cover malfunctions, injuries and damages that result from misuse, unauthorized modifications, and external causes such as acts of nature.

Warranty exclusion applies in the following cases:

- Damage due to wrong handling or tampering
- Damage due to wrong application
- Damage due to shock, dirt or moisture
- Damage due to operation by non-qualified staff
- Damage due to nonobservance of safety regulations or accident prevention regulations
- Damage due to modifications to the operating manual

Imprint

Purpose and use

The operating manual explains the handling and operation of the display and the firmware in connection with standard accessories for use in laboratories and the industry.

Please read especially the safety instructions carefully and observe them all.

The operating manual should always be at hand to help you solve any questions or problems that may arise.

All rights reserved

This manual has been prepared with all due care, nevertheless faults and omissions cannot be fully precluded.

soniKKs GmbH reserves the right to make changes to the technical data and specifications during the course of further development of the product without given prior notice.

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